

D00127

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey Hydrographic/Side Scan Sonar

Field No. AHP-10-14-98

Registry No. D00127

LOCALITY

State Florida

General Locality Key West

Locality Key West Harbor and Approaches

1998

CHIEF OF PARTY
Brian Link

LIBRARY & ARCHIVES

DATE MAR 13 2000

REGISTRY NUMBER:

D00126/D00127

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NUMBER:

AHP-10-13/14-98

State: Florida

General locality: Key West

Locality: Key West Harbor and Approaches

Scale: 1: 10,000 Date of survey: October 1-6, 1998

Instructions dated: October 2, 1998 Project Number: OPR-S-H906-AHP

Vessel: NOAA Launch 1210

Chief of Party: Brian Link

Surveyed by: David Elliott, Robert Ramsey, Phil Wolf

Soundings taken by echo sounder, hand lead-line, or pole: Innerspace Model 448

Graphic record scaled by: AHP Personnel

Graphic record checked by: AHP Personnel

Protracted by: N/A Automated plot by: _____

Verification by: Atlantic Hydrographic Branch Personnel (N/CS33)

Soundings in: Feet: _____ Fathoms: _____ Meters: (*) at MLW: _____ MLLW: (*): _____

Remarks: Hand written notes in the Descriptive Report were made during office processing

AL015/SURF - 2/2/00 551

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEYS D-00126/D-00127
S-H906-AHP
FIELD NO's AHP-10-13-98/AHP-10-14-98
SCALE: 1:10,000
1998
ATLANTIC HYDROGRAPHIC PARTY TWO
CHIEF OF PARTY: Brian A. Link (acting)

A. PROJECT

This survey was conducted according to Hydrographic Project Instructions S-H906-AHP, Key West Harbor and Approaches, Florida, dated October 2, 1998.

The purpose of project S-H906-AHP was to obtain complete 200 % side scan sonar coverage in the channels, approaches and harbor area of Key West, Florida. This survey was conducted to verify that these areas are clear of submerged debris which may have resulted from hurricane Georges on September 24, 1998.

The survey was conducted in response to requests from the U.S. Coast Guard 7th District Marine Safety Office, Captain of the Port and the U.S Coast Guard Group, Key West.

This descriptive report covers two surveys: Sheet A/D00126/AHP-10-13-98 and Sheet B/D00127/AHP-10-14-98 as well as the approach to Safe Harbor, which lies outside of both sheet limits.

B. AREA SURVEYED

The area surveyed as specified by the Project Instructions is the Main Ship Channel into Key West, the Northwest Channel into Key West, the harbor turning basin, the North Channel and the Safe Harbor entrance to Stock Island.

This survey was conducted from October 1, 1998 (DN: 274) through October 6, 1998 (DN: 279).

C. SURVEY VESSEL

NOAA launch 1210, a 27-foot SeaArk, was used to collect all survey data. There were no unusual vessel configurations or problems encountered with the vessel.

D. AUTOMATED DATA ACQUISITION AND PROCESSING *SEE ALSO EVALUATION REPORT*

HYPACK version 7.1A was used for on-line data acquisition. The HPS version 8.2 programs updated through May 29, 1998 and HP Tools version 1.72 were used for data processing. MapInfo Professional Version 4.5, with Vertical Mapper Version 1.5, was used to support processing and plot all survey data. The NOS programs VELOCITY (Version 3.0) and Microsoft Word 97 were also used during this survey.

E. SONAR EQUIPMENT

An Edge Tech model 260-TH image correcting side scan sonar recorder (S/N 020417) with a model 272-TD towfish (S/N 020892), was used throughout this survey. The side scan sonar equipment was used to conduct dual beam surveying and investigate contacts found in navigable waters. The system frequency used was 100 & 500 kHz. The recorder was set on 50/75/100-meter range scales. There were no water depths greater than 25.0 meters. The confidence checks were performed daily on existing buoys in the Key West Channels at 500kHz.

A coverage of 200% was obtained in all the navigable waters where vessel traffic is predominant. The towfish was deployed off the starboard quarter of the vessel, which proved very stable. Distorted images caused by strong tidal currents were seen periodically. All contacts and shadows were manually scaled and entered into a HPS contact table to determine the height off the bottom. The significant contacts were then compared by position, as well as common depth and relationship to channels to determine if diver Investigations were warranted. A total of 134 contacts were noted and 33 were addressed by reduced line spacing with single beam development. Contacts in the Northwest Channel were not investigated because none were identified that had heights off the bottom that were shoaler than the controlling depth of 15 feet for the channel. Contacts deemed insignificant and those found outside of the channel were not investigated since they posed no imminent danger for current vessel traffic and because of time constraints for this survey. All areas surveyed were track line/swath line plotted to insure complete coverage.

F. SOUNDING EQUIPMENT

An Innerspace model 448 depth sounder, S/N 188, was used to collect all echo soundings on this survey. A standard lead line calibrated in meters, S/N 1210, was used during this survey for comparison with the echo sounder. No problems were encountered with any of the sounding equipment.

G. CORRECTIONS TO ECHO SOUNDINGS

Correctors for the velocity of sound through water were determined from the casts listed below:

<u>Cast No.</u>	<u>Table No.</u>	<u>Deepest * Depth(m)</u>	<u>Applicable DN(s)</u>	<u>Cast Position</u>		<u>Day Taken</u>
1	1	12.9	274-279	24°30'24"N	081°48'06"W	275

* extended depth after processing

The instrument used for determining corrections for the speed of sound through the water column was a Seabird-Seacat Velocity Profiler, model 19-03, S/N 198671-1477. The manufacturer calibrated this unit on December 18, 1997. Data quality assurance tests were performed after each cast. Program VELOCITY was used for computing the correctors. Corrections were applied to the sounding plot using the HPS REAPPLY program. Copies of the velocity tables and support documentation are in the Survey Separates.*

The lead line for launch 1210 was calibrated using a steel tape on January 6, 1997. No corrections were necessary. A copy of the calibration form is in the "Survey Separates.*" A static draft of 0.5 meters was applied to the final sounding plot by the HPS REAPPLY program. The draft was measured by subtracting the difference from a punch mark on the side of launch 1210, 0.6 meter above the transducer, to the water surface.

Settlement and squat measurements for launch 1210 were taken on September 23, 1997 (DN: 266). These measurements were conducted in the Cooper River, Charleston, SC using the level method. The data from this test is included in the Survey Separates.* Settlement and squat correctors were applied to the final sounding plot using the HPS REAPPLY program.

Field tide reduction of soundings is based on unverified actual heights from the Internet for station 872-4580, Key West, FL. The values were downloaded from: <http://www.opsd.nos.noaa.gov/ftp/pwldata.html>. Correctors for nine tidal zones on S-H906-AHP were used as designated by the Project Instructions. The zones were numbered with the following correctors:

Zone #		<u>Time (min. High Water)</u>	<u>Low Water</u>	<u>Range Ratio</u>
	KEY500	- 54 min	- 54 min	x0.95 *
	KEY501	-42 min	-42 min	x0.99
	KEY502	-30 min	-30 min	x0.99
	KEY503	-12 min	-12 min	x0.99
	KEY505	0 min	0 min	x1.00
	KEY506	+18 min	+18 min	x0.99
	KEY507	+36 min	+36 min	x0.99
	KEY508	+60 min	+60 min	x1.07
	KEY513	+60 min	+60 min	x1.07 **

* Used for Safe Harbor Channel to Stock Island

** Used for North West Channel

* DATA FILED WITH ORIGINAL FIELD RECORDS

All elevations and soundings on survey D-00126 and D-00127 are based on MLLW unless otherwise specified. Approved tide levels were requested from the Product and Services Branch, Datums Section, N/OES23, in a letter dated October 23, 1998. A copy is appended to this report. *APPROVED TIDES AND ZONING HAVE BEEN APPLIED DURING OFFICE PROCESSING.*

H. CONTROL STATIONS *SEE ALSO THE EVALUATION REPORT*

The horizontal control datum for this project is the North American Datum (NAD) of 1983. The control reference station used for this survey was the USCG DGPS Key West beacon (Station ID 811) located at 24°34.93608'N, 081°39.18175'W.

I. HYDROGRAPHIC POSITION CONTROL

Non-Differential GPS (stand alone) and Differential (DGPS) were used for all hydrographic data acquired on this survey. A Starlink DGPS Beacon Receiver (S/N 795) and antenna (S/N 4132) were used as the remote station on launch 1210. *SEE ALSO THE EVALUATION REPORT*

DGPS performance checks were conducted in accordance with FPM 3.4.4 by comparing the DGPS position of the vessel to the position of the following calibration point:

Opening / Closing: Key West Turning Basin Lt. 27 24°34'01.910"N 081°48'28.112"W

To obtain a performance check, the launch was brought alongside the checkpoint and the easting, northing, number of SVs, HDOP, and time of observation were noted on the echogram. These values were then entered into an Excel spreadsheet which computes the acceptable error margin (based on the HDOP) and also the observed difference between the known and observed position. The table of these comparisons is included in the Survey Separates.* All of the observed differences fell well within the allowable limit. It should be noted that the non-differential position was also compared and fell within 7 to 8 meters of the third-order position for Key West Turning Basin Light 27 listed above.

J. SHORELINE *SEE ALSO THE EVALUATION REPORT*

There was no photogrammetric source data for this project.

K. CROSSLINES

There were no crosslines run during this survey, the purpose of which was to insure the channel was clear for transiting vessel traffic.

** DATA FILED WITH ORIGINAL FIELD RECORDS*

L. JUNCTIONS SEE ALSO THE EVALUATION REPORT

Not applicable.

M. COMPARISON WITH PRIOR SURVEYS SEE ALSO THE EVALUATION REPORT

See the Atlantic Hydrographic Branch's "Evaluation Report for S-H906-AHP".

N. ITEM INVESTIGATION REPORTS

There were no AWOIS items assigned to this survey.

O. COMPARISON WITH THE CHART SEE ALSO THE EVALUATION REPORT

Comparison was made with the following charts:

<u>Chart No.</u>	<u>Source Edition</u>	<u>Raster Edition</u>	<u>Edition Date</u>
11441	38 th ED	01	Oct. 04, 1997
11447	33rd ED	03	Aug. 09, 1997

There were no dangers to navigation noted during this reconnaissance survey.

In general the survey soundings show agreement with the charted soundings within 1 to 3 feet. Soundings listed in the following chart comparisons are corrected for unverified actual tides.

Safe Harbor

- The controlling depth found in the Safe Harbor Entrance Channel into Stock Island was a 13-foot sounding at 24°^{33'}33.18"N, 081°^{44'}01.95"W. This agrees with the charted least depth in this channel. *DO NOT CONCERN SEE EVALUATION REPORT - CONTROLLING DEPTHS*
- There is a 13-foot survey sounding on a charted 19-foot at 24°32'55.64"N, 081°43'59.01"W. This sounding appears to be on a ridge approximately 125 meters long, running on a NW to SE axis. This does not present a danger to navigation because of the previously discussed 13-foot controlling depth for this channel. There was a cluster of lobster traps noted on the echogram over this feature. These traps were littering the channel after the hurricane. *SEE EVALUATION REPORT, SEC. 0*
- The charted wreck PA, inside Safe Harbor was found to have a 17.7-foot least depth sounding at 24°33'46.53"N, 081°44'07.98"W. The feature is small and based on the sonagram image and surrounding soundings the hydrographer recommends removing the charted wreck symbol PA, and charting an obstruction at the survey position above. *CONCERN W/CLARIFICATION SEE EVALUATION REPORT, SEC. 0*

DELETE PA

*CHART 16 OBSTNS @ LAT 24° 33' 47.919
LON 81° 44' 09.053*

- A 16.7-foot spike was located inside Safe Harbor at 24°33'47.91"N, 081°44'09.15"W. This sounding lies approximately 80 meters at a bearing of 194° from a charted 18-foot sounding in an area which now shows depths from 22 to 26 feet. There was no evidence of the 18-foot sounding at the charted location. *CONCUR*

The Atlantic Hydrographic Party was advised by Captain Mike McGraw of the Key West Pilots Association (305) 295-0997 that the maximum allowable keel draft into Key West Harbor is 28.5 feet up to pier B and 27 feet north of pier B.

Main Channel Range

- No soundings shallower than the depths shown in the charted channel tabulation were found within this range. The controlling depth was a ~~35~~³³-foot sounding at 24°28'~~32.27~~^{31.04}" N, 081°48'~~06.99~~^{08.51}" W.

Cut A Range

- No soundings shallower than the depths shown in the charted channel tabulation were found within this range. The controlling depth was a 34-foot sounding at 24°30'~~54.97~~^{31.11.32}" N, 081°48'~~20.30~~^{32.64}" W.
- The charted 32-foot rock symbol on chart 11447 at 24°31'46.24" 081°48'58.62"W, does not appear on chart 11441* The soundings and sonargram show a rock or coral head in this vicinity as shown on chart 11447. This feature should be added to chart 11441. * *CONCUR w/ ADD DANCE CURVE 32' RK ON CHART 11441 CLARIFICATION*
NO CHANGE IN CHARTING STATUS ON CHART 11447

Cut B Range

- No soundings shallower than the depths shown in the charted channel tabulation were found within this range. The controlling depth was a 34-foot in the transition zone between Cut A and Cut B. *DO NOT CONCUR SEE EVALUATION REPORT*

Whitehead Spit

- The charted 18-foot sounding at 24°32'03.21"N, 081°48'20.84"W, does not exist and was disproved by side scan sonar. The current depths in this region are 33 feet. *CONCUR*
- There were no apparent signs of shoaling on the west side of Whitehead spit adjacent to Cut B Range. Several single beam echo sounding lines were run parallel to the 18-foot contour at the request of the Key West Pilots Association and the United States Coast Guard. *CONCUR*

Key West Harbor Range

- No soundings shallower than the depths shown in the charted channel tabulation were found within this range up to lighted buoy "G23". The controlling depth was a 33-foot sounding at 24°33'20.92" N, 081°48'41.13"W. *CONCUR*

- No soundings shallower than the depths shown in the charted channel tabulation were found within this range from lighted buoy "G23" to the Turning Basin. The controlling depth was a 31-foot sounding at 24°33'39.41" N, 081°48'32.50"W. *Do NOT CONCUR SEE EVALUATION REPORT*
- The centerline approach into Key West Channel was found to be controlled by a 16-foot sounding at 24°33'^{46.57}45.74"N, 081°48'^{22.38}23.07"W. *CONCUR*
- The charted Turning Basin in Key West Harbor at 24°34'00"N, 081°48'16.75"W, was found to have soundings ranging from 24 feet in the north corner to an average depth of ~~31~~³² feet. These soundings are in agreement with charts 11441 and 11447. *CONCUR*
- There is a 22-foot sounding at the north end of the municipal wharf at 24°33'40.11"N, 081°48'27.34"W. This sounding is five feet shallower than the keel draft of vessels brought in by the Key West Pilots. This sounding is within 8 meters of the bulkhead and at the far northern end of the pier and presents no danger to navigation. The Key West Pilots were advised of this sounding during a meeting with the Atlantic Hydrographic Party at the U.S. Coast Guard Station in Key West, Fl. *CONCUR*

Lower Turning Basin (As defined by Key West Pilots at 24°33'24.38"N, 081°48'45.75"W)

- The soundings within this turning basin range from 33 feet to ~~37~~³⁸ feet. Currently charted soundings compare within two feet. *CONCUR*
- No evidence was seen on the sonargrams of the charted 31-foot wreck at 24°33'08.37"N, 081°48'51.24"W. Depths in the area were 34 feet. The hydrographer recommends removing the wreck symbol from the chart. *CONCUR (AWOIS 2575) DELETE (31) WK CHART 11447 OBSTN CHART 11441*
- No evidence was seen on the sonargrams of the charted 32-foot obstruction at 24°33'07.69"N, 081°48'54.12" W. Depths in the area were of 36 feet. The hydrographer recommends removing the wreck symbol from the chart. *CONCUR (AWOIS 3576) DELETE (32) OBSTN*

North West Channel

- The North West channel was covered with a side scan sonar swath of 350 meters, 175 meters each side of center, and showed no signs of contacts or obstructions shallower than the charted depth of ~~15~~¹³ feet at 24°38'^{03.0}12.47"N, 081°53'^{48.0}55.85"W. *SEE EVALUATION REPORT (PRIOR SURVEY H10086)*
- All currently charted ranges serve their intended purpose.

P. ADEQUACY OF SURVEY *ALSO SEE EVALUATION REPORT*

This is a complete reconnaissance survey of the area required in the Project Instructions to insure safe navigation and reopen the port of Key West, Florida. *CONCUR w/ CLARIFICATION*

Q. AIDS TO NAVIGATION

All aids to navigation were found on station and serving their intended purpose but were not positioned by AHP during the course of this reconnaissance survey.

R. STATISTICS

<u>Description</u>	<u>Quantity</u>
Total Number of Positions	4368
Total Linear Nautical Miles of Hydrography	16
Total Linear Nautical Miles of Cross Lines	0
Total Linear Nautical Miles of Side Scan Sonar	91
Square Nautical Miles Completed	2
Days of Production	6
Detached Positions	0
Bottom Samples	0
Velocity Casts	1

S. MISCELLANEOUS

Bottom samples were not taken on this survey.

T. RECOMMENDATIONS

OR MULTIBEAM

A complete basic 200% side scan sonar/survey is recommended for this area. Other recommendations are made in section O of this report.

U. REFERRAL TO REPORTS

None.

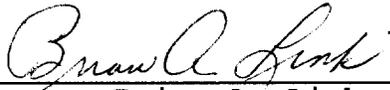
Submitted by:


David B. Elliott
Atlantic Hydrographic Party

APPROVAL SHEET
Reconnaissance Surveys
S-H906-AHP
AHP-10-13-98/AHP-10-14-98
D00126/D00127
1998

These reconnaissance surveys were conducted in accordance with the project instructions for S-H906-AHP, the Hydrographic Manual, the Hydrographic Survey Guidelines, and the Field Procedures Manual. All reports, records, and survey sheets were reviewed by the Launch Hydrographer-in-charge. The descriptive report was reviewed and approved by the Chief of Party. The Chief of Party did not directly supervise any part of this survey

These surveys are complete reconnaissance surveys for the area described in Section B of this report.



Brian A. Link
Chief, Atlantic Hydrographic Party (acting)



David B. Elliott
Launch Hydrographer-in-charge



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: December 4, 1998

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: S-H906-AHP

HYDROGRAPHIC SHEET: D00127

LOCALITY: Key West Northwest Channel, FL

TIME PERIOD: October 1 - October 6, 1998

TIDE STATION USED: 872-4580 Key West, FL

Lat. 24° 33.2'N Lon. 81° 48.5'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.472 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: KEY506, KEY507, KEY512, KEY513 &
KEY514.

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units
(meters), relative to MLLW and on Greenwich Mean Time.

Thomas V. Mero 12/4/98

CHIEF, REQUIREMENTS AND ENGINEERING BRANCH



Final tide zone node point locations for S H906-AHP-98,
Sheet D00127.

Format: Longitude in decimal degrees (negative value denotes
Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone KEY506			
-81.845348 24.575663	8724580	+18	0.99
-81.844465 24.560719			
-81.807018 24.557643			
-81.80438 24.561745			
-81.845348 24.575663			
Zone KEY507			
-81.823099 24.58545	8724580	+36	0.99
-81.845348 24.575663			
-81.80438 24.561745			
-81.800673 24.559661			
-81.795402 24.566267			
-81.801537 24.56769			
-81.802066 24.568968			
-81.804144 24.569788			
-81.823099 24.58545			
Zone KEY512			
-81.844465 24.560719	not available		
-81.845348 24.575663			
-81.920984 24.604688			
-81.988785 24.573806			
-81.889428 24.562318			
-81.862567 24.562476			
-81.844465 24.560719			
Zone KEY513			
-81.823099 24.58545	not available		
-81.909639 24.657747			
-81.920984 24.604688			
-81.845348 24.575663			
-81.823099 24.58545			
Zone KEY514			
-81.823099 24.58545	not available		
-81.812992 24.598592			
-81.807251 24.603656			

-81.807624 24.613534
-81.813127 24.618907
-81.816932 24.624218
-81.832341 24.66426
-81.909639 24.657747
-81.823099 24.58545

Final Zoning for S-H906-AHP-98 Sheet D00127 Key West, FL



UNITED STATES - EAST COAST
KEY WEST HARBOR
AND APPROACHES
FLORIDA

SCALE: AS SHOWN ON SHEET S-H906-AHP-98
DATE: 10/10/00
BY: [Signature]

KEY	DESCRIPTION
KEY 512	Time Corrector not available Range Corrector not available Reference not available
KEY 513	Time Corrector not available Range Corrector not available Reference not available
KEY 514	Time Corrector not available Range Corrector not available Reference not available
KEY 507	Time Corrector +36 mins Range Corrector x0.99 Reference 8724580
KEY 506	Time Corrector +18 mins Range Corrector x0.99 Reference 8724580

81° 58'

81° 48'

Additional Requ

B - D00127

24° 32'

S-H906-AHP

Florida - Key West

Main Ship and Northwest Channels

D00126 (AHP-10-13-98)

D00127 (AHP-10-14-98)



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: December 4, 1998

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: S-H906-AHP

HYDROGRAPHIC SHEET: D00126

LOCALITY: Key West Main Ship Channel, FL

TIME PERIOD: October 1 - October 6, 1998

TIDE STATION USED: 872-4580 Key West, FL
Lat. 24° 33.2'N Lon. 81° 48.5'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.472 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: KEY500, KEY501, KEY502, KEY503,
KEY505, KEY506, KEY507, KEY508, KEY509, KEY512, KEY513,
KEY515, KEY516, KEY517, KEY518, KEY526, KEY530, KEY531,
KEY532, KEY534, KEY535, KEY536, KEY537, KEY542, KEY543,
KEY544, KEY545, KEY546 & KEY547.

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units
(meters), relative to MLLW and on Greenwich Mean Time.

Thomas V. Mero 12/4/98

CHIEF, REQUIREMENTS AND ENGINEERING BRANCH



Final tide zone node point locations for S H906-AHP-98,
Sheet D00126.

Format: Longitude in decimal degrees (negative value denotes
Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone KEY500			
-81.775992 24.535053	8724580	-54	0.95
-81.941153 24.425672			
-81.700264 24.42624			
-81.699342 24.547416			
-81.775992 24.535053			
Zone KEY501			
-81.775992 24.535053	8724580	-42	0.99
-81.785812 24.549102			
-81.801704 24.547133			
-81.805252 24.544514			
-82.016851 24.433808			
-82.017158 24.42567			
-81.941153 24.425672			
-81.775992 24.535053			
Zone KEY502			
-81.805252 24.544514	8724580	-30	0.99
-81.805176 24.545764			
-81.811959 24.545726			
-82.01777 24.470844			
-82.016851 24.433808			
-81.805252 24.544514			
Zone KEY503			
-81.811959 24.545726	8724580	-12	0.99
-81.811538 24.549691			
-81.889694 24.535103			
-81.927802 24.527988			
-82.014704 24.502261			
-82.01777 24.470844			
-81.811959 24.545726			
Zone KEY505			
-81.807018 24.557643	8724580	0	1.00
-81.844465 24.560719			
-81.8616 24.550599			

-81.883726 24.53926
-81.889694 24.535103
-81.811538 24.549691
-81.805995 24.549925
-81.807018 24.557643

Zone KEY506

-81.845348 24.575663	8724580	+18	0.99
-81.844465 24.560719			
-81.807018 24.557643			
-81.80438 24.561745			
-81.845348 24.575663			

Zone KEY507

-81.823099 24.58545	8724580	+36	0.99
-81.845348 24.575663			
-81.80438 24.561745			
-81.800673 24.559661			
-81.795402 24.566267			
-81.801537 24.56769			
-81.802066 24.568968			
-81.804144 24.569788			
-81.823099 24.58545			

Zone KEY508

-81.807251 24.603656	8724580	+60	1.07
-81.812992 24.598592			
-81.823099 24.58545			
-81.804144 24.569788			
-81.802066 24.568968			
-81.801537 24.56769			
-81.795402 24.566267			
-81.795695 24.587451			
-81.795722 24.59019			
-81.795751 24.592245			
-81.800354 24.598499			
-81.804401 24.600932			
-81.807251 24.603656			

Zone KEY509

-81.844465 24.560719	not available		
-81.8616 24.550599			
-81.883726 24.53926			
-81.889694 24.535103			
-81.920152 24.529492			
-81.912005 24.537632			
-81.908361 24.542437			
-81.896868 24.552044			
-81.889428 24.562318			
-81.862567 24.562476			
-81.844465 24.560719			

Zone KEY512

-81.844465	24.560719	not available		
-81.845348	24.575663			
-81.920984	24.604688			
-81.988785	24.573806			
-81.889428	24.562318			
-81.862567	24.562476			
-81.844465	24.560719			

Zone KEY513

-81.823099	24.58545	not available		
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-81.920984	24.604688			
-81.845348	24.575663			
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Zone KEY515

-81.800354	24.598499	8724580	+78	0.92
-81.795751	24.592245			
-81.795374	24.595383			
-81.791876	24.624493			
-81.79385	24.626697			
-81.800987	24.634364			
-81.807606	24.632277			
-81.810977	24.625819			
-81.816932	24.624218			
-81.813127	24.618907			
-81.807624	24.613534			
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-81.804401	24.600932			
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Zone KEY516

-81.791876	24.624493	8724580	+96	0.88
-81.773091	24.598408			
-81.795751	24.592245			
-81.795751	24.592245			
-81.795751	24.592245			
-81.795374	24.595383			
-81.791876	24.624493			

Zone KEY517

-81.773091	24.598408	8724580	+114	0.84
-81.767569	24.588832			
-81.795695	24.587451			
-81.795751	24.592245			
-81.795751	24.592245			
-81.773091	24.598408			

Zone KEY518

-81.795695	24.587451	8724580	+126	0.80
-81.748201	24.589832			
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-81.745059 24.586069
-81.745192 24.584682
-81.744101 24.583928
-81.748866 24.570945
-81.750195 24.570597
-81.772791 24.565643
-81.774115 24.564668
-81.777454 24.561379
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-81.790836 24.564643
-81.795402 24.566267
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Zone KEY526

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-81.748949 24.563331			
-81.746494 24.563869			
-81.741016 24.563927			
-81.741013 24.564862			
-81.745388 24.564805			
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Zone KEY530

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-81.740943 24.567348			
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-81.739702 24.566373			
-81.739712 24.565083			
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Zone KEY531

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-81.748873 24.56029			
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Zone KEY532

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-81.741006 24.560434
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-81.740936 24.565117
-81.741013 24.564862

Zone KEY534

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-81.74807 24.555486			
-81.744417 24.55648			
-81.736209 24.5585			
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-81.744837 24.558119			
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Zone KEY535

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-81.75497 24.551864			
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-81.744395 24.55648			
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Zone KEY536

-81.737342 24.566803	8724580	-36	1.11
-81.737342 24.566803			
-81.737342 24.566803			
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-81.736397 24.562643			
-81.736209 24.5585			
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Zone KEY537

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-81.737342 24.566803			
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Zone KEY542

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Zone KEY543

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-81.724055 24.565545			
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-81.72401 24.569204			
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Zone KEY544

-81.724055 24.565545	8724580	-12	0.80
-81.717232 24.560067			
-81.718642 24.558179			
-81.718642 24.558179			
-81.723658 24.55856			
-81.725034 24.561111			
-81.725641 24.560828			
-81.726487 24.561161			
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-81.726005 24.562522			
-81.72802 24.565106			
-81.727127 24.565821			
-81.724055 24.565545			

Zone KEY545

-81.726005 24.562522	8724580	-24	0.95
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-81.726487 24.561161			
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-81.723658 24.55856			
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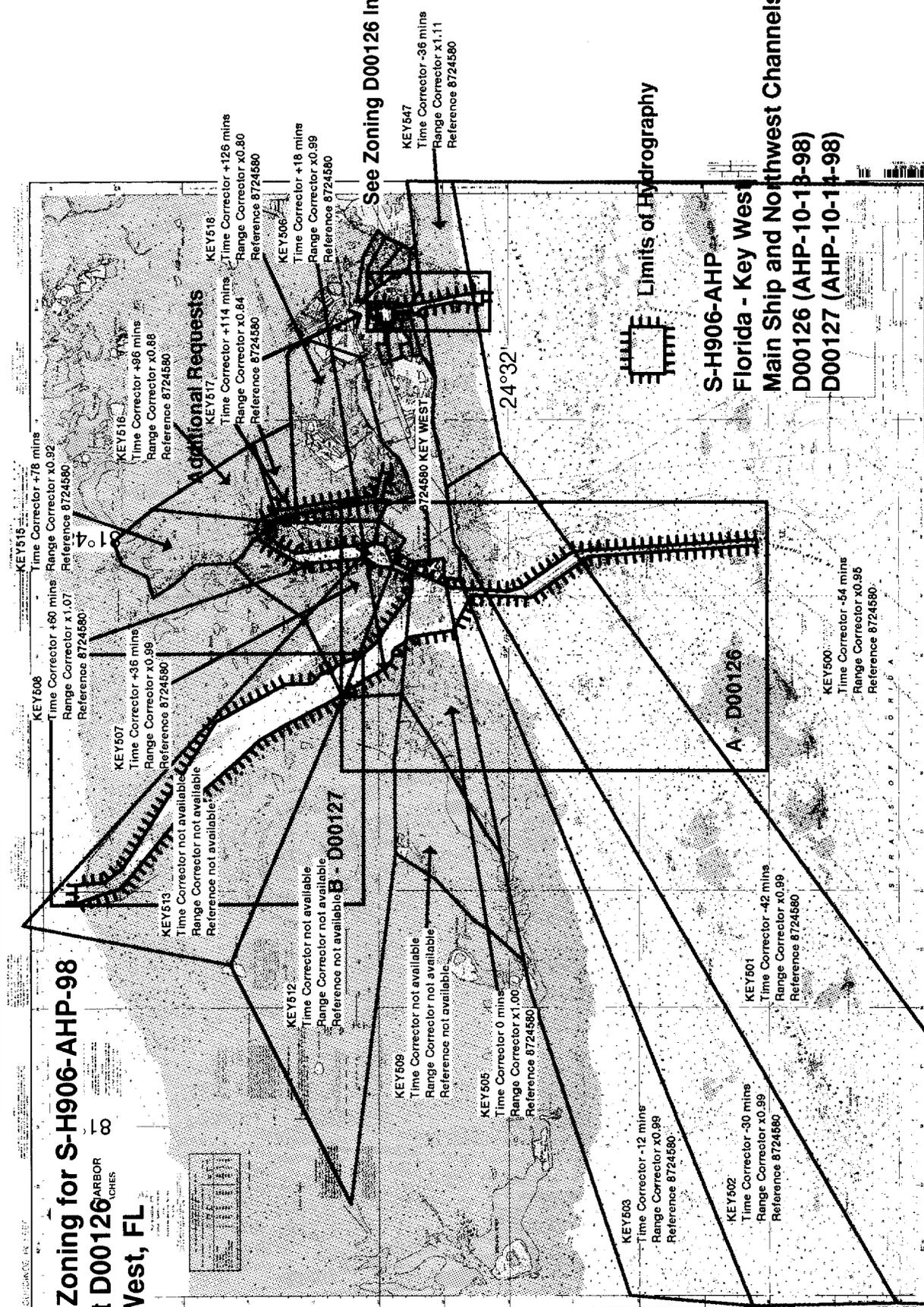
Zone KEY546

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-81.73014	24.555543			
-81.732344	24.557077			
-81.723658	24.55856			

Zone KEY547

-81.785812	24.549102	8724580	-36	1.11
-81.775992	24.535053			
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-81.699183	24.559104			
-81.717116	24.55697			
-81.721899	24.556453			
-81.73014	24.555543			
-81.732344	24.557077			
-81.733577	24.557972			
-81.734147	24.55795			
-81.736347	24.557986			
-81.737604	24.5545			
-81.75477	24.551913			
-81.767547	24.55265			
-81.777693	24.550447			
-81.785812	24.549102			

Final Zoning for S-H906-AHP-98
Sheet D00126
Key West, FL



11441

11441

GEOGRAPHIC NAMES

D-126/127

Name on Survey	A CHART NO. 11447, 11445, 11441 B ON PREVIOUS SURVEY NO. C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K										
	A	B	C	D	E	F	G	H	K		
CALDA BANK <i>2/24/00</i>	X		X							1	
COW KEY	X		X							2	
EASTERN TRIANGLE	X		X							3	
FLEMING KEY CUT	X		X							4	
FLORIDA (title)	X		X							5	
FRANKFORT BANK	X		X							6	
KEY WEST (ppl)	X		X							7	
KINGFISH SHOALS	X		X							8	
MIDDLE GROUND	X		X							9	
NORTHWEST CHANNEL	X		X							10	
TANK ISLAND	X		X							11	
WESTERN TRIANGLE	X		X							12	
WHITEHEAD SPIT	X		X							13	
WISTERIA ISLAND	X		X							14	
										15	
										16	
										17	
										18	
										19	
										20	
										21	
										22	
										23	
										24	
										25	

Dennis J. Rowling
AUG 25 1999

N/CS 33-08-00

LETTER TRANSMITTING DATA

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY
(Check):

- ORDINARY MAIL
- AIR MAIL
- REGISTERED MAIL
- EXPRESS
- GBL (Give number) _____

DATE FORWARDED

2-11-0

NUMBER OF PACKAGES

ONE TUBE

TO:

NOAA / National Ocean Service
 Chief, Data Control Group, N/CS3x1
 SSMC3, Station 6815
 1315 East-West Hwy.
 Silver Spring, MD 20910-3282

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

D00126 / D00127 OPR-S-H906-AHP

Florida
Key West Harbor and Approaches

1 Descriptive Report / Evaluation Report
 2 Drawing History forms 76-71 for NOS Charts 11441 & 11447

2 Smooth Sheets

2 Mylar H-Drawings = NOS Chart 11441 & 11447

4 Paper Composite Plots = NOS Charts 11441
 3 Paper Composite Plots = NOS Charts 11447

FROM: (Signature)

Maxine Fetterly

RECEIVED THE ABOVE

(Name, Division, Date)



Return receipted copy to:

Maxine Fetterly
 Atlantic Hydrographic Branch
 439 W. York St.
 Norfolk, VA 23510

02/11/2000

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: D00126

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		2134
NUMBER OF SOUNDINGS		2134
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	20.5	12/11/1998
VERIFICATION OF FIELD DATA	238.0	11/30/1999
QUALITY CONTROL CHECKS	11.5	
EVALUATION AND ANALYSIS	60.5	
FINAL INSPECTION	12.5	10/13/1999
COMPILATION	117.5	02/09/2000
TOTAL TIME	460.5	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		11/23/1999

02/11/2000

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: D00127

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		2134
NUMBER OF SOUNDINGS		2134
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	20.5	12/11/1998
VERIFICATION OF FIELD DATA	238.0	11/30/1999
QUALITY CONTROL CHECKS	11.5	
EVALUATION AND ANALYSIS	60.5	
FINAL INSPECTION	12.5	10/13/1999
COMPILATION	117.5	02/09/2000
TOTAL TIME	460.5	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		11/23/1999

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR D00126/D00127 (1998)**

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

Hydrographic Processing System
MicroStation 95, version 5.05
SiteWorks, version 2.1
NADCON, version 2.10
I/RAS B, version 5.01

The smooth sheet was plotted using a Hewlett Packard DesignJet 2500CP plotter.

H. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). The smooth sheet has been annotated with ticks showing the computed mean shift between the NAD 83 and the North American Datum of 1927 (NAD 27).

To place this survey on the NAD 27 datum, move the projection lines 1.533 seconds (47.16 meters or 4.72 mm at the scale of the survey) north in latitude and 0.670 seconds (18.85 meters or 1.88 mm at the scale of the survey) east in longitude.

J. SHORELINE

Brown shoreline originates with National Ocean Service (NOS) charts 11441, 38th edition, Oct. 4, 1997 and 11447, 34th edition April 18, 1998 and is for orientation purposes only.

L. JUNCTIONS

There are no junctional surveys adjacent to the present

survey. Present survey depths are in harmony with the charted hydrography in the adjacent areas.

M. COMPARISON WITH PRIOR SURVEYS

1. Hydrographic

H08295	(1956)	1:10,000
H08762	(1963)	1:20,000
H09505	(1966)	1:10,000
H10086	(1984)	1:5,000
H10125	(1984)	1:5,000
<u>F00283</u>	<u>(1986)</u>	<u>1:5,000</u>

The above prior surveys taken together cover the present survey area in its entirety.

H08295 (1956) covers the present survey in the channel going into Safe Harbor on Stock Island. Survey depths from the prior survey vary (\pm) 0-5 feet (0-1⁵ m) from the present survey depths. The following should be noted:

A charted 7 foot shoal depth, in Latitude 24°32'36"N, Longitude 81°43'59"W, originates with the prior survey as a 17 foot depth. This depth was charted in error on the 33rd edition of chart 11441 (1987), due to the number one (1) being obscured by the grid line. It is recommended that the depth be deleted from the chart and the area be charted as shown on the present survey.

H08762 (1963) covers the present survey area from Longitude 81°49'00"W eastward, including Stock Island. Present survey depths show a general trend of being 0-6 feet (0-1⁸ m) deeper than the prior survey depths.

H09505 (1966) covers the majority of the present survey from Latitude 24°28'00"N to Latitude 24°35'00"N. Present survey depths show a general trend of being 0-3 feet (0-0⁹ m) deeper than the prior survey depths.

H10086 (1984) covers the northwest section of the present survey. Prior survey depths vary (\pm) 0-3 feet (0-0⁹ m) from the present survey depths. The 18 foot ridge in the vicinity of Latitude 24°37'15"N, Longitude 81°52'40"W, has migrated eastward. The following should be noted:

A charted 13 foot shoal depth, in Latitude 24°38'03"N, Longitude 81°53'48"W, originates with the prior survey. This depth was not investigated by the field unit and has been brought forward from the prior survey to supplement the present survey. No change in charting status is recommended.

H10125 (1984) covers an area in the Northwest Channel from Latitude 24°34'00"N to Latitude 24°37'00"N. Survey depths from the prior survey show a general trend of varying (\pm) 0-4 feet (0-1² m) from the present survey. The following should be noted:

1. AWOIS (Automated Wreck and Obstruction Information System) Item #4598, a charted 21 foot shoal depth, in Latitude 24°34'57.02"N, Longitude 81°50'36.33"W, originates with the prior survey. This item was neither assigned nor addressed by the field unit and has been brought forward from the prior survey to supplement the present survey. Side scan sonar records indicate an irregular bottom. No change in charting status is recommended.

2. A charted 17 foot shoal depth, in Latitude 24°35'08"N, Longitude 81°50'43"W, originates with the prior survey. This depth was neither assigned nor addressed by the field unit and has been brought forward from the prior survey to supplement the present survey. Side scan sonar records indicate an irregular bottom. No change in charting status is recommended.

F00283 (1986) covers the western extent of the upper turning basin in Key West Harbor. Prior survey depths are in good agreement with the present survey varying (\pm) 0-3 feet (0-0⁹ m). The 18 foot and 30 foot depth curves in the vicinity of Latitude 24°33'48"N, Longitude 81°48'23"W, have migrated northwest into the turning basin.

The differences between the above prior surveys and the present survey depths may be attributed to natural changes in the bottom configuration and improved survey technology and techniques. Positioning errors due to the use of non-differential GPS must also be taken into consideration.

2. Wire Drag

F00342WD (1982) 1:10,000

There are six AWOIS items originating with the prior survey located just west of the Key West Harbor Range in the vicinity of Latitude 24°33'10"N, Longitude 81°48'45"W. The following should be noted:

1. AWOIS Item #2579, a submerged rock with a depth of 33 feet, in Latitude 24°33'25.82"N, Longitude 81°48'42.08"W, originates with the prior survey. This feature is charted as submerged rocks with a depth of 33 feet on chart 11447 due to its proximity to AWOIS Items #2580 and #2581. The item was neither assigned nor addressed by the field unit and has been brought forward from the prior survey to supplement the present survey. No change in charting status is recommended.

2. AWOIS Item #2580, a coral head with a depth of 32 feet, in Latitude 24°33'26.89"N, Longitude 81°48'40.86"W, originates with the prior survey. This feature is charted as submerged rocks with a depth of 32 feet. The item was neither assigned nor addressed by the field unit and has been brought forward from the prior survey to supplement the present survey. No change in charting status is recommended.

3. AWOIS Item #2581, an uncharted coral head with a depth of 34 feet, in Latitude 24°33'26.14"N, Longitude 81°48'42.33"W, originates with prior survey. This feature was neither assigned nor addressed by the field unit and has been brought forward from the prior survey to supplement the present survey. No change in charting status is recommended.

4. AWOIS Item #2582, a charted dangerous rock with a depth of 23 feet (7 m), in Latitude 24°33'38.58"N, Longitude 81°48'35.89"W, originates with the prior survey. This feature was neither assigned nor addressed by the field unit and has been brought forward from the prior survey to supplement the present survey. No change in charting status is recommended.

Except as noted above, the present survey is adequate to supercede the prior surveys in the common area.

O. COMPARISON WITH CHARTS 11441 (38th Edition, Oct 4/97)
11447 (34th Edition, Apr 18/98)

Hydrography

The charted hydrography originates with the previously discussed prior surveys and miscellaneous sources. An adequate comparison is made in section O. of the Descriptive Report and needs no further discussion. Attention is directed to the following:

1. A charted sunken wreck PD, in Latitude 24°33'46.5"N, Longitude 81°44'08.0"W, originates with an unknown source. An obstruction with a depth of 17 feet (5² m) was located by the field unit in Latitude 24°33'46.53"N, Longitude 81°44'07.98"W, and an obstruction with a depth of 16 feet (4⁹ m) was located in Latitude 24°33'47.91"N, Longitude 81°44'09.15"W. It is recommended that the wreck be deleted and the obstructions with a depth of 16 feet (4⁹ m) be charted as shown on present survey.

2. AWOIS Item #3101, a charted sunken wreck PD, in Latitude 24°38'37.52"N, Longitude 81°54'05.34"W, originates with Local Notice to Mariners 17, 1973 (LNM17/73). This item was neither assigned nor addressed by the field unit. No change in charting status is recommended.

3. AWOIS Item #4599, a charted 20 foot depth, in Latitude 24°36'03.52"N, Longitude 81°51'27.33"W, originates with Army Corps of Engineers Blue Print 101290, 1977 (BP101290/77). This item was neither assigned nor addressed by the field

unit. An inspection of side scan sonar records indicate an irregular bottom. No change in charting status is recommended.

4. A charted rock with a depth of 32 ft, in Latitude 24°31'46.24"N, Longitude 81°48'58.62"W, on chart 11447 originates with an unknown source. Chart 11441 shows a 32 foot depth with the rock descriptor displaced to the south of the charted depth. An inspection of echo sounder and side scan sonar records indicate a rock or coral head in this area. It is recommended that a danger curve be added to the rock on chart 11441. No change in charting status is recommended on chart 11447.

5. The following charted features originate with unknown sources. These features were neither assigned nor addressed by the field unit. No change in charting status is recommended.

<u>Feature</u>	<u>Latitude N</u>	<u>Longitude W</u>
obstruction	24°33'43"	81°48'26"
pile	24°33'47"	81°48'19"
subm piles	24°33'47"	81°48'18"
pile	24°33'40"	81°44'06"
pile	24°33'43"	81°44'07"

Controlling Depths

A natural channel into Safe Harbor with a charted depth of 13 feet, in Latitude 24°32'44"N, Longitude 81°43'58"W has shoaled. A present survey 12 foot depth (3⁷ m), in Latitude 24°32'55.64"N, Longitude 81°43'59.01"W was located.

A conflict exists with the controlling depth of 34 feet in the Left Outside Quarter of Cut B Range. The present survey shows depths of 29 feet (8⁸ m) from Latitude 24°32'27.90"N to Latitude 24°32'36.34"N.

A conflict exists with the controlling depth of 30 feet in the Key West Harbor Range Channel from buoy 23 to the Turning Basin. The present survey shows depths of 29 feet (8⁸ m) in

Latitude 24°33'43.28"N, Longitude 81°48'28.57"W and in
Latitude 24°33'48.91"N, Longitude 81°48'28.97"W.

O. ADEQUACY OF SURVEY

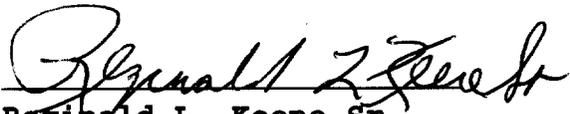
The USCG DGPS Key West beacon tower was damaged during hurricane Georges (September 24, 1998) resulting in non-differential GPS being used for data acquisition from October 2 to October 4, 1998. Comparisons made during office processing showed good agreement, although it is recommended that a complete basic hydrographic/side scan sonar be run in this area.

S. MISCELLANEOUS

Chart compilation using the present survey data was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compiled data will be forwarded to Hydrographic Survey Division, Silver Spring, Maryland.

The following NOS charts were used for compilation of the present survey: 11441 (38th Edition, October 4/97)
11447 (34th Edition, April 18/98)

D00126/D00127

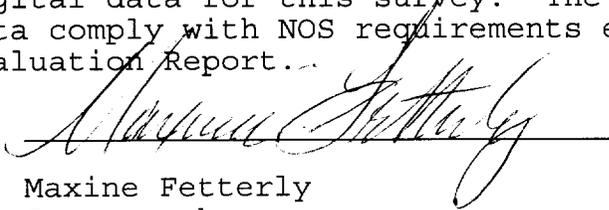
A handwritten signature in cursive script, reading "Reginald L. Keene Sr.", written in black ink.

Reginald L. Keene Sr.
Cartographic Technician
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
D00126/D00127

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disapproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

 Date: 11/16/99

Maxine Fetterly
Cartographer
Atlantic Hydrographic Branch

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

 Date: 11/23/99

Andrew L. Beaver
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

Final Approval:

Approved:  Date: March 13, 2000

Samuel P. DeBow, Jr.
Captain, NOAA
Chief, Hydrographic Surveys Division

